Cambridge IGCSE

**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | |

**CHEMISTRY** **0620/62**

Paper 6 Alternative to Practical **October/November 2015**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.



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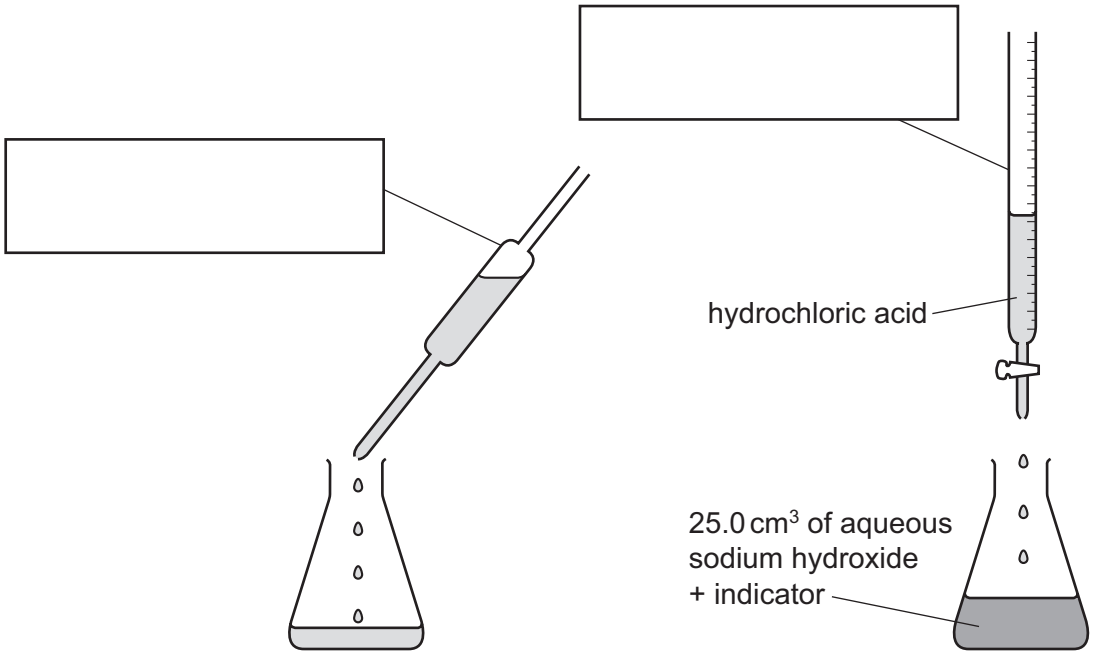
CAMBRIDGE International Examinations

**1** The volume of hydrochloric acid that reacts with 25.0 $cm^3$ of aqueous sodium hydroxide can be found using the apparatus below.




View solution

**(a)** Complete the boxes to identify the pieces of apparatus labelled. [2]

View solution

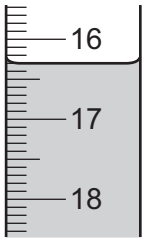
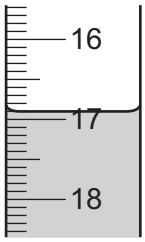
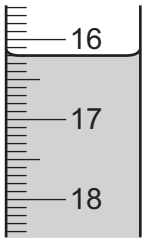
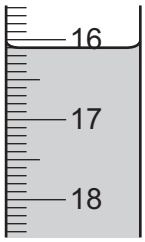
**(b)** Name a suitable indicator that could be used.

..... [1]

**(c)** A student did the experiment four times and the volume of hydrochloric acid added each time was measured.

View solution

Use the burette diagrams in the table to record the volumes of hydrochloric acid added.

| experiment | burette diagram | volume of acid added / $cm^3$ |
|---|---|---|
| 1 |   | |
| 2 |   | |
| 3 |   | |
| 4 |   | |

[2]

**(d) (i)** What type of chemical reaction occurs when hydrochloric acid reacts with sodium hydroxide?

..... [1]

**(ii)** How did the student know when all of the sodium hydroxide had reacted?

..... [1]

View solution

**(e) (i)** Which **one** of the results is anomalous?

..... [1]

**(ii)** Suggest what may have caused this result to be anomalous.

View solution

..... [1]

**(iii)** Use the other results to calculate the average amount of hydrochloric acid that reacted with the sodium hydroxide solution.

.....

..... [2]

**(f)** Which of the solutions was more concentrated? Explain your answer.

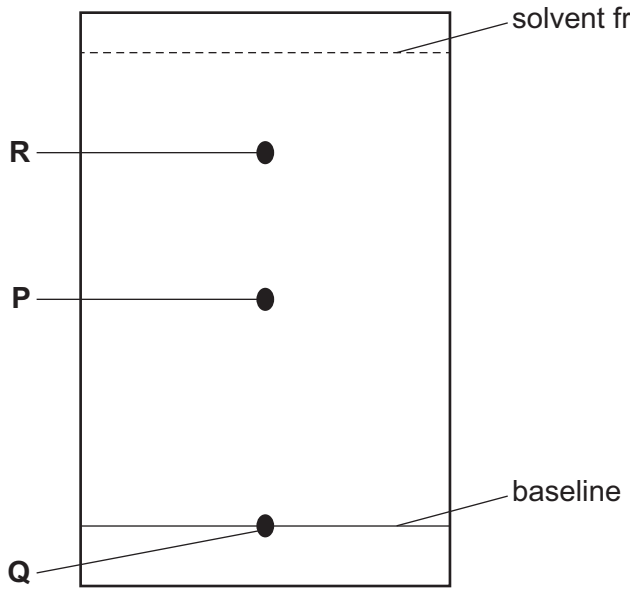
View solution

.....

..... [2]

[Total: 13]

**2** A mixture of three compounds, **P**, **Q** and **R**, was separated using a piece of paper.




**(a)** Name this method of separation.

View solution

..... [1]

**(b)** What could have been used to apply the mixture onto the paper?

View solution

..... [1]

**(c)** Suggest a possible solvent that could be used for this separation.

View solution

..... [1]

**(d)** Suggest why compound **Q** remained on the baseline.

View solution

.....

..... [1]

**(e)** $R_f$ values are used to identify compounds.

View solution

$$R_f = \frac{\text{distance travelled by compound}}{\text{distance travelled by the solvent}}$$

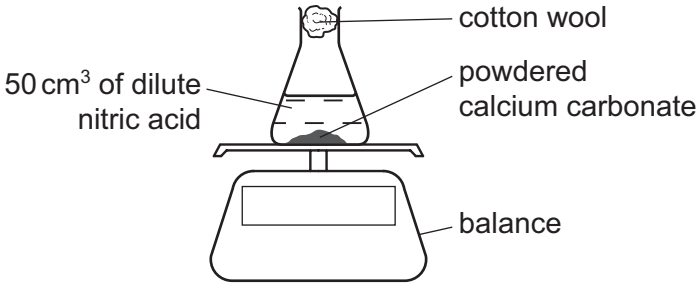
Use the diagram to work out the $R_f$ value of compound **R**.

.....

..... [2]

[Total: 6]

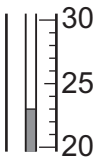
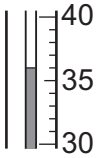
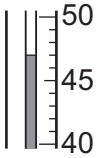
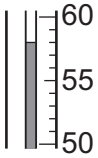
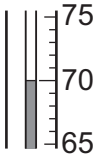
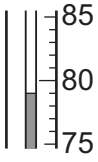
**3** A teacher demonstrated the rate of reaction of dilute nitric acid with powdered calcium carbonate at different temperatures.
50 $cm^3$ of dilute nitric acid was heated to a known temperature and placed on a balance.




Excess powdered calcium carbonate was added to the nitric acid and the mass of the beaker and contents recorded. The time taken for the mass to decrease by 1 g was measured. The experiment was repeated at different temperatures.

View solution

**(a)** Using the thermometer diagrams, record the temperatures in the table.

| thermometer diagram | temperature of nitric acid / °C | time for mass to decrease by 1 g in seconds |
|---|---|---|
|   | | 139 |
|   | | 102 |
|   | | 99 |
|   | | 60 |
|   | | 45 |
|   | | 38 |

[3]

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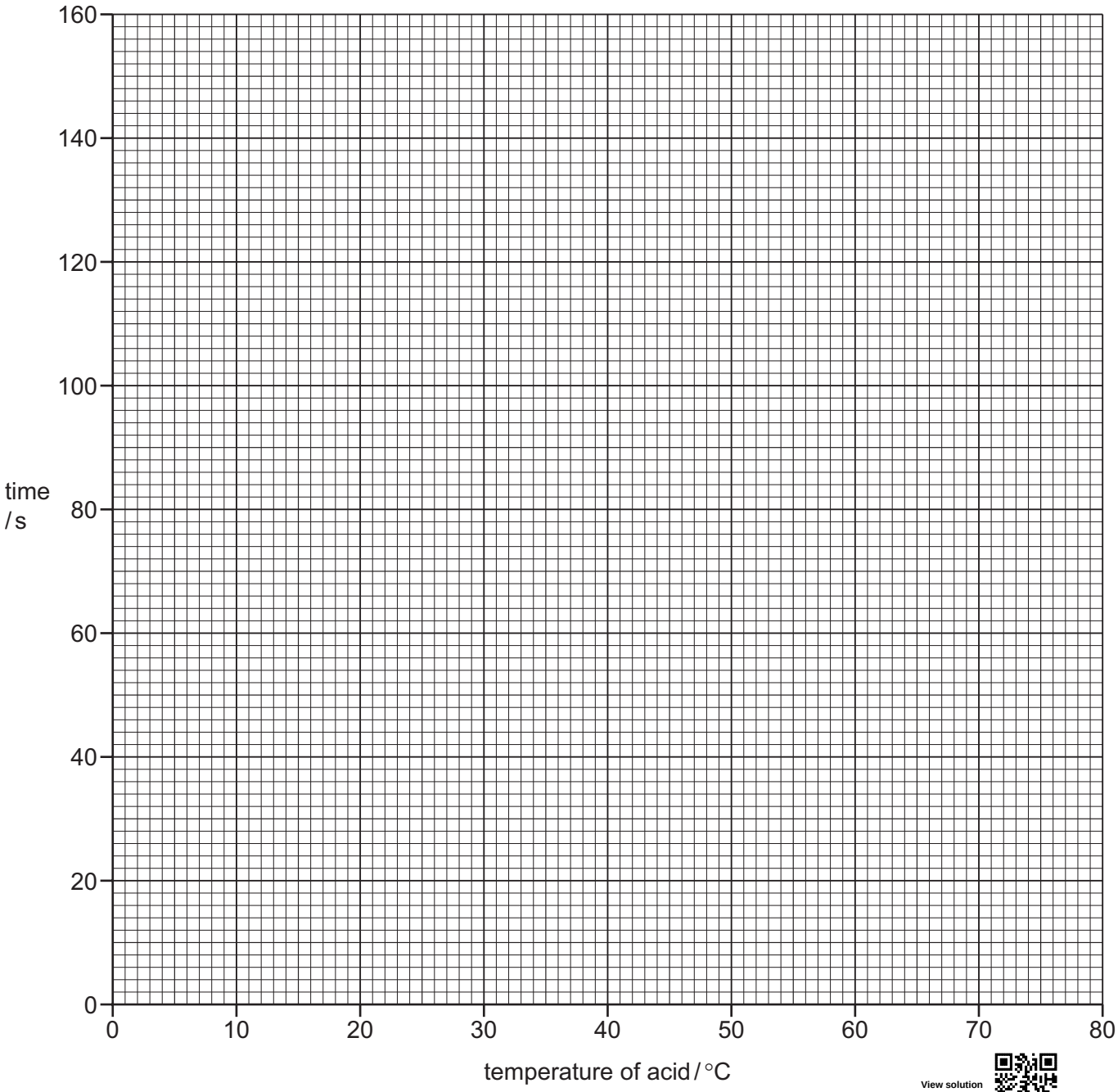
**(b)** Plot the results on the grid and draw a smooth line graph.




View solution [3]

**(c)** Which point is inaccurate? Explain why you chose this point.

View solution

.....

..... [2]

**(d)** **Use your graph** to find out the time of reaction at a temperature of 30 °C. Show clearly on the grid how you obtained your answer.

..... [3]

**(e) (i)** How does the rate of this reaction vary with the change in temperature?

..... [1]

**(ii)** Explain why.

View solution

.....

.....

..... [2]

**(f) (i)** What would be the effect of repeating the experiments using lumps of calcium carbonate instead of powdered calcium carbonate? Explain your answer.

.....

..... [2]

**(ii)** Sketch on the grid the curve you would expect. View solution [1]

**(g)** Explain why cotton wool was used in the neck of the conical flask.

.....

..... [2]

[Total: 19]

View solution

**4** Three jars of gas have lost their labels. The gases are known to be

View solution

- ethene,
- ammonia,
- oxygen.

Complete the table to show the chemical tests that could be used to identify each of these gases.

| gas | chemical test | result of test |
|---|---|---|
| ethene | ..... ..... | ..... ..... [2] |
| ammonia | ..... ..... | ..... ..... [2] |
| oxygen | ..... ..... | ..... ..... [2] |

[Total: 6]

**5** Two aqueous solutions, **K** and **L**, were analysed. Solution **L** was aqueous calcium iodide. Tests on the solutions and some of the observations are in the following tables. Complete the observations in the second table.

View solution

| tests | observations |
|---|---|
| <u>tests on solution **K**</u><br><br>**(a)** Colour of solution **K**. | green / blue |
| **(b)** The solution was divided into four equal portions.<br><br>**(i)** Aqueous sodium hydroxide was added to the first portion drop by drop and shaken.<br><br>An excess of aqueous sodium hydroxide was then added to the mixture.<br><br>**(ii)** Aqueous ammonia was added to the second portion drop by drop and shaken.<br><br>An excess of aqueous ammonia was then added to the mixture.<br><br>**(iii)** Dilute nitric acid and barium nitrate solution were added to the third portion.<br><br>**(iv)** Dilute nitric acid and silver nitrate solution were added to the fourth portion. | View solution<br><br>pale blue precipitate<br><br>the precipitate was insoluble<br><br>blue precipitate<br><br>the precipitate dissolved to form a deep blue solution<br><br>no visible change<br><br>white precipitate formed |

**(c)** Identify solution **K**.

..... [2]

View solution

| tests | observations |
|---|---|
| <u>tests on solution **L**</u><br><br>**(d)** Colour of solution **L**. View solution | ..... [1] |
| **(e)** The solution was divided into three equal portions.<br><br>**(i)** Aqueous sodium hydroxide was added to the first portion of the solution drop by drop and shaken.<br><br>An excess of aqueous sodium hydroxide was then added to the mixture.<br><br>**(ii)** Aqueous ammonia was added to the second portion of the solution drop by drop and shaken.<br><br>An excess of aqueous ammonia was then added to the mixture and shaken.<br><br>**(iii)** Dilute nitric acid and silver nitrate solution were added to the third portion of the solution. | ..... [2]<br><br>..... [1]<br><br>..... [1]<br><br>..... [1]<br><br>..... [2] |

[Total: 10]

View solution

**6** You are provided with samples of three metals, tin, zinc and silver.

View solution

Plan an investigation to show the order of reactivity of these three metals.
You are provided with common laboratory apparatus and dilute acids.

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..... [6]

[Total: 6]

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